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## Impact of integrated farming system: Nutritional security and doubling of farmers income

Khushbu and Kanta Sabharwal

### Abstract

In India, the farmers maintain different enterprises for their complimentary and supplementary nature and for ensuring sustainable livelihood from time immemorial. After the advent of green revolution in late-1960s and economic liberalization in early-1990s, the farmers gradually started focusing on a few enterprises due to several imposing factors including shrinking farm sizes, fluctuating commodity prices, livelihood diversification and shortage of labor during peak agriculture season. It had a severe impact on food and nutritional security of millions of poor farm households. The anguish of farmers is often expressed in terms of their agitation in one or the other part of the country, unwillingness to continue farming and increasing demands of compensating their economic loss. The study entitled "Assessment of Integrated Farming System in Haryana" was conducted in two Western and Eastern agro-climatic zones of Haryana state, covering two districts of each zone and three villages from each district with random sample techniques with 120 respondents. The study's primary focus was to determine the impact of the Integrated Farming System on farmers income and nutritional security of the family. It was found that majority of respondents showed positive impact on fulfillments of need requirement of the respondents through income generated in IFS, household income, nutritional status, self-improvement, economic improvement, environmental improvement, livelihood security in adoption of Integrated Farming System.

**Keywords:** Integrated farming system, impact, need requirement, household income, nutritional status, self-improvement, economic improvement, environmental improvement, livelihood security etc.

### Introduction

Now days, farmers are subjected to a high degree of uncertainty in their income due to their dependence majorly on a single enterprise. India needs to adopt a "well designed" Integrated Farming System (IFS) to overcome this problem. The emergence of Integrated Farming System has enabled us to develop a framework for an alternative development model to improve the feasibility of small sized farming operations in relation to larger ones. Integrated Farming System refers to agricultural systems that integrate livestock and crop production or integrate fish and livestock and may sometimes be known as integrated bio systems. In this system, an inter-related set of enterprises are used so that the waste from one component becomes an input for other enterprises of the system, which reduces cost and improves production and thereby income. Integrated farming systems seem to be the possible solution to the continuous increase of demand for food and nutrition, income stability and livelihood upliftment particularly for small and marginal farmers with little resources. Kumar *et al.*, (2018) [4].

Integrated Farming System is a promising approach for increasing overall productivity and profitability through recycling the farm by-products and efficient utilization of available resources. About 95% of the nutritional requirement of the system is self-sustained through resource recycling. As the number of enterprises is increased, the profit margin also increases. It could further generate employment opportunities to the farming communities round the year and provide better economic and nutritional security. This can go a long way uplift rural life through increased income. Keeping all these points in mind present study was designed to determine the impact of the Integrated Farming System on farmers income and nutritional security of the family.

### Methodology

The study was conducted in two agro-climatic (Eastern and Western) zones of Haryana State. Two districts namely Hisar and Bhiwani were selected randomly from Western zone and

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Kaithal and Jind districts were selected from Eastern Zone. Three villages were selected purposively from each selected district namely Harikot, Mangali and Kaimri from Hisar district, Bwani Kheda, Prem Nagar and Kungad from Bhiwani district, Peyoda, Songal and Kheri Sheru from Kaithal district and Kaer Kheri, Ahirka and Julna from Jind district and 10 Respondents were selected purposively (who were doing integrated farming) from each villages. Out of each selected District 30 respondents were selected at random thus a total of 120 respondents were selected for the purpose of investigation. A well-structured interview schedule was prepared to obtain information from respondents. The data were collected personally by the researcher and obtained data

were analyzed by using frequency and percentage.

**Results and Discussion**

**Impact of Integrated Farming System**

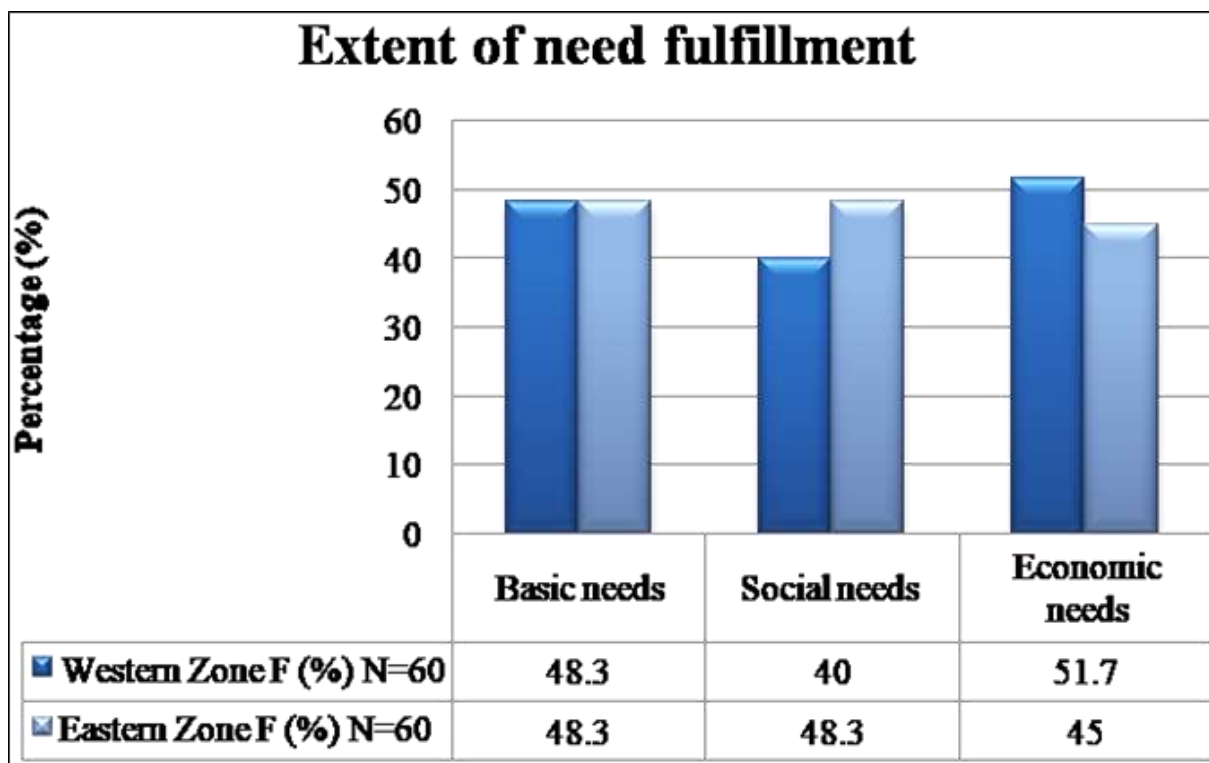
**Fulfillments of need requirement of the respondents through income generated in IFS**

Results in Table 1 shows that in Western zone majority of respondents were fully satisfied with their basic need requirement (48.3%) followed by, social needs (40.0%) and economic needs (51.6%). In case of Eastern zone 48.3 per cent of respondents were partially satisfied of their basic needs and social need whereas economic needs were fully satisfied (45.0%).

**Table 1:** Fulfillments of need requirement of the respondents through income generated in IFS N=120

Need Requirement	Extent of need fulfillment					
	Western Zone F (%) N=60			Eastern Zone F (%) N=60		
	Fully satisfied	Partially Satisfied	Not satisfied	Fully satisfied	Partially Satisfied	Not satisfied
Basic	29	26	5	22	29	9
	(48.3)	(43.4)	(8.3)	(36.7)	(48.3)	(15.0)
Social	24	23	13	19	29	12
	(40.0)	(38.3)	(21.7)	(31.7)	(48.3)	(20.0)
Economic	31	13	16	27	15	18
	(51.7)	(21.6)	(26.7)	(45.0)	(25.0)	(30.0)

Figures in parenthesis indicate percentages.



**Fig 1:** Fulfillments of need requirement of the respondents through income generated in IFS

**Impact of IFS on household income**

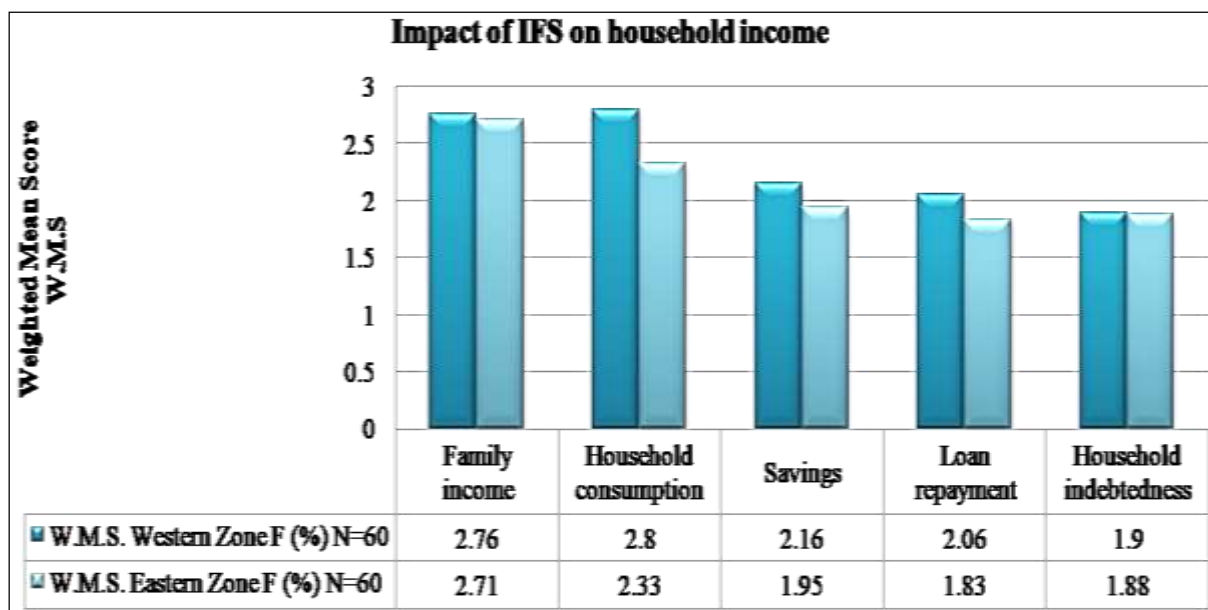
Table 2 shows that the majority of respondents in the Western zone reported an increase in household consumption, ranked first with a 2.8 weighted mean score, an increase in family income (WMS = 2.76, rank II) and an increase in savings (WMS = 2.16, rank III) in the Western zone. Whereas, in the eastern zone, the majority of respondents reported an increase in family income, ranked first with a 2.71 weighted mean

score, an increase in household consumption (WMS = 2.33, rank II) and an increase in savings (WMS = 1.95, rank III). This might be the reason that, due to the integration of crops, farmers could get increased profitability with small and marginal land holdings. The present findings are in tune with Yadav *et al.*, 2017 [13]; Mukhils *et al.*, 2018 [7] and Panwar *et al.*, 2018 [8].

**Table 2:** Impact of IFS on household income N=120

Aspects	Western Zone F (%) N=60			W.M.S.	Rank	Eastern Zone F (%) N=60			W.M.S.	Rank
	I	D	R.S.			I	D	R.S.		
<b>Household income</b>										
Family income	48 (80.0)	10 (16.7)	2 (3.3)	2.76	II	47 (78.3)	9 (15.0)	4 (6.7)	2.71	I
Household consumption	51 (85.0)	6 (10.0)	3 (5.0)	2.8	I	35 (58.3)	13 (21.7)	9 (15.0)	2.33	II
Savings	33 (55.0)	4 (6.7)	23 (38.3)	2.16	III	23 (38.3)	11 (18.3)	26 (43.4)	1.95	III
Loan repayment	11 (18.3)	42 (70.0)	7 (11.7)	2.06	IV	5 (8.3)	40 (66.7)	15 (25.0)	1.83	V
Household indebtedness	8 (13.3)	38 (63.4)	14 (23.3)	1.9	V	9 (15.0)	35 (58.3)	16 (26.7)	1.88	IV

Figures in parenthesis indicate percentages  
(I-Increase, D-Decrease, R.S-Remain same, W.M.S. -Weighted Mean Score)



**Fig 2:** Impact of IFS on household income

**Impact of IFS on nutritional status of the respondent**

Table 3 revealed that majority of respondents in the Western zone reported an increase in good quality of food, with a weighted mean score of 2.78 ranking first, followed by increase in expenditure on health care (WMS=2.68, rank II), and an increase in availability of fresh fruits and vegetables (WMS=2.46, rank III), indicating an impact of IFS on nutritional status. In the Eastern zone, increased availability of

fresh fruits and vegetables ranked first with a weighted mean score of 2.98, followed by good quality of food (WMS=2.91, rank II), and increased expenditure on health care (WMS=2.55, rank III). This might be the reason that farmers can fulfill their daily need requirements through fruits and vegetables available in their farm. The similar results are in line with the Manjunatha *et al.*, (2014) [6] and Panwar *et al.*, (2018) [8].

**Table 3:** Impact of IFS on nutritional status N=120

Aspects	Western Zone F (%) N=60			W.M.S.	Rank	Eastern Zone F (%) N=60			W.M.S.	Rank
	I	D	R.S.			I	D	R.S.		
Nutritious food Intake	37 (61.7)	11 (18.3)	12 (20.0)	2.41	IV	31 (51.7)	7 (11.6)	22 (36.7)	2.15	V
Good quality of Food	53 (88.3)	1 (1.7)	6 (10.0)	2.78	I	57 (95.0)	1 (1.7)	2 (3.3)	2.91	II
Expenditure on health care	49 (81.7)	3 (5.0)	8 (13.3)	2.68	II	45 (75.0)	3 (5.0)	12 (20.0)	2.55	III
Availability of fresh fruits and vegetables	42 (70.0)	4 (6.7)	14 (23.3)	2.46	III	51 (85.0)	5 (8.3)	4 (6.7)	2.98	I
Chemical free food for family	35 (58.3)	9 (15.0)	16 (26.7)	2.31	V	33 (55.0)	14 (23.3)	13 (21.7)	2.33	IV

Figures in parenthesis indicate percentages  
(I-Increase, D-Decrease, R.S-Remain same, W.M.S. -Weighted Mean Score)

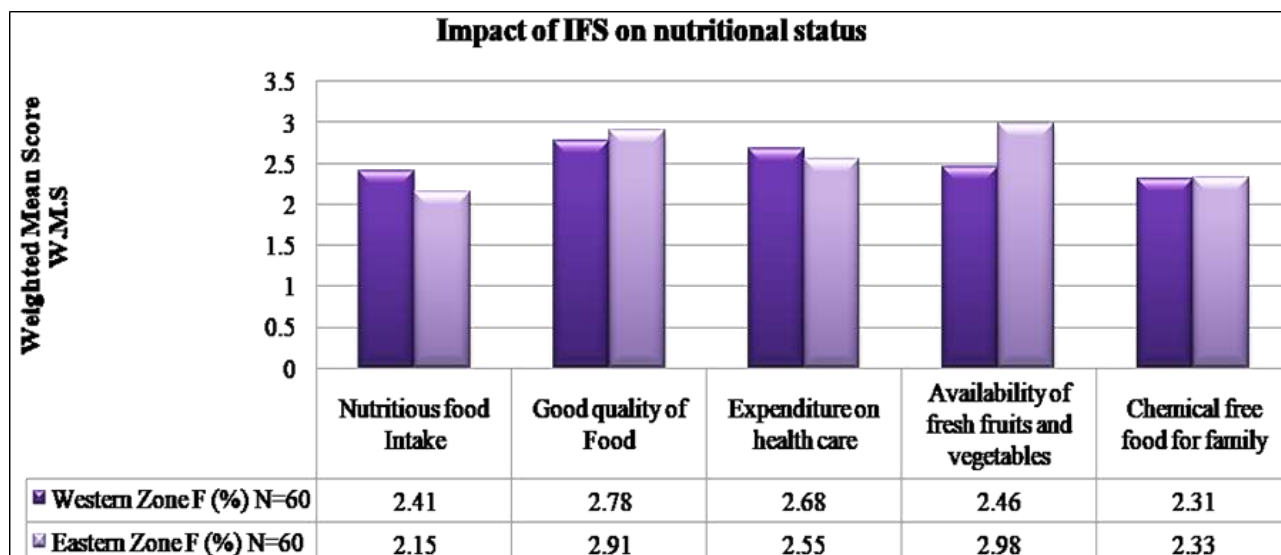


Fig 3: Impact of IFS on nutritional status

**Impact of IFS on self-improvement of the respondent**

Table 4 results shows that majority of respondents in the Western zone indicated increase in empowerment through participation in group activities, which received first place with a weighted mean score of 2.58. Increase self-confidence (WMS=2.55, rank II), increase in risk taking ability (WMS=2.41, rank III), responses among respondents

indicating impact of IFS on household income. While in the Eastern zone, the majority of respondents reported an increase in self-confidence (WMS=2.36, rank II), empowered through participation in group activities (WMS=2.36, rank III) and get recognition in society (WMS=2.28, rank III) among respondents indicating an impact of IFS on self-improvement.

Table 4: Impact of IFS on self-improvement of the respondent N=120

Aspects	Western Zone F (%) N=60			W.M.S.	Rank	Eastern Zone F (%) N=60			W.M.S.	Rank
	I	D	R.S.			I	D	R.S.		
Self confidence	43 (71.7)	7 (11.6)	10 (16.7)	2.55	II	31 (51.7)	7 (11.6)	22 (36.7)	2.15	V
Risk taking ability	4 (66.7)	5 (8.3)	15 (25.0)	2.41	III	57 (95.0)	1 (1.7)	2 (3.3)	2.91	II
Empower through participation in group activities	44 (73.3)	7 (11.7)	9 (15.0)	2.58	I	45 (75.0)	3 (5.0)	12 (20.0)	2.55	III
Self-respect	38 (63.3)	3 (5.0)	19 (31.7)	2.31	IV	51 (85.0)	5 (8.3)	4 (6.7)	2.98	I
Recognition in society	20 (33.3)	13 (21.7)	27 (45.0)	1.88	V	33 (55.0)	14 (23.3)	13 (21.7)	2.33	IV

Figures in parenthesis indicate percentages (I-Increase, D-Decrease, R.S-Remain same, W.M.S. -Weighted Mean Score)

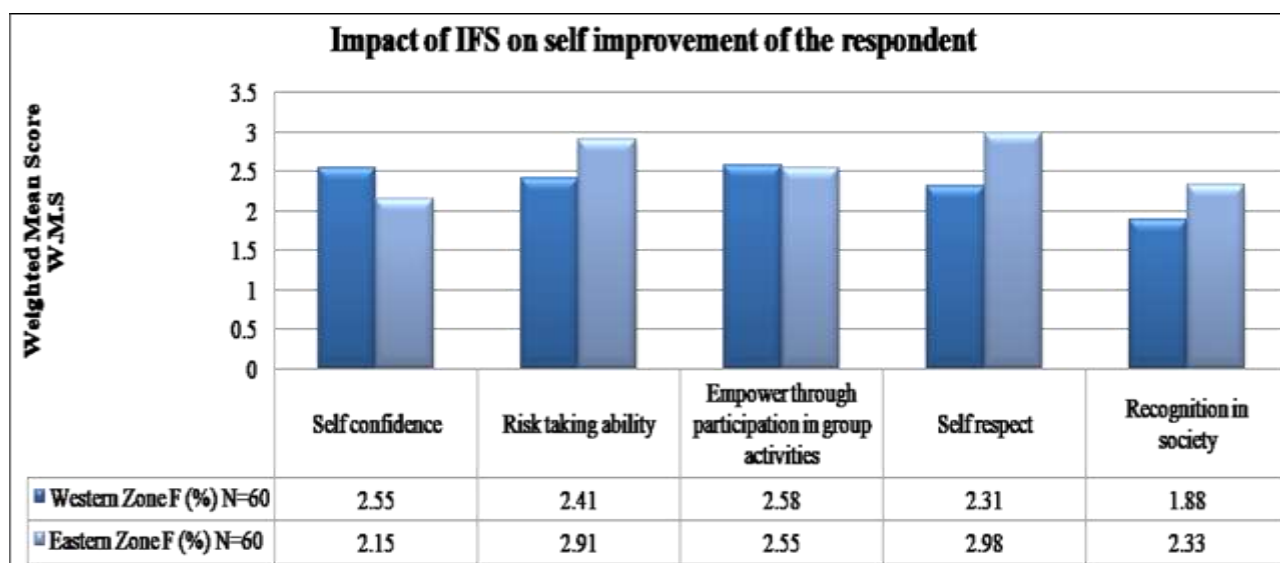


Fig 4: Impact of IFS on self-improvement of the respondent

**Impact of IFS on economic improvement of the respondent**

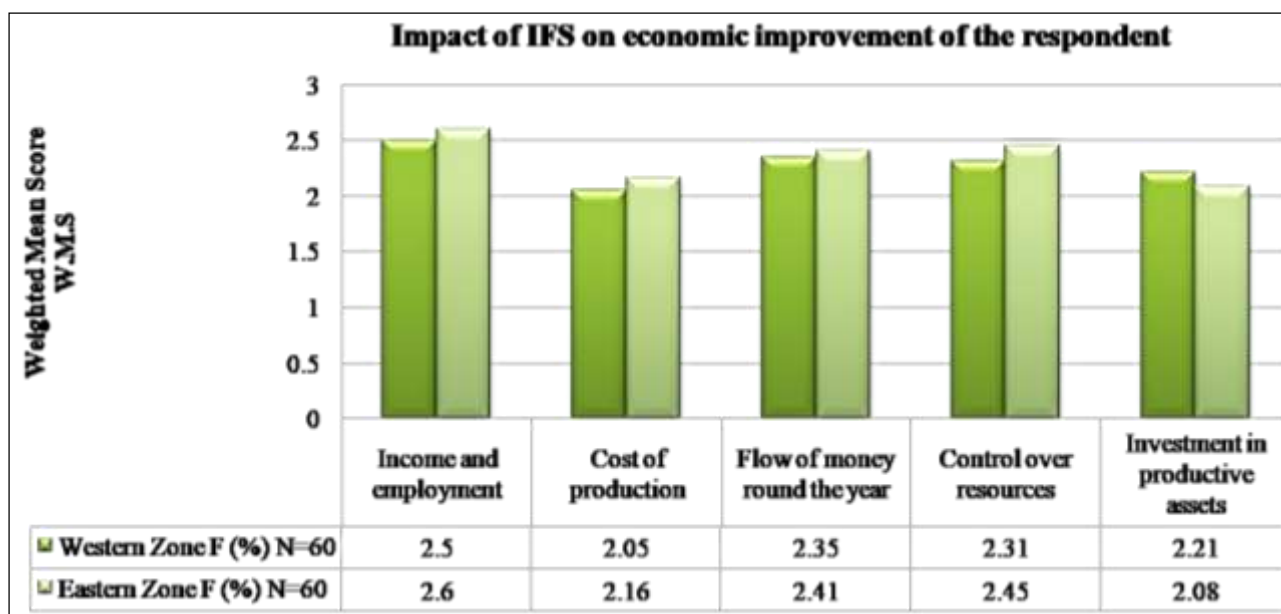
Table 5 revealed that majority of respondents in the Western zone reported an increase in income and employment (WMS=2.5), an increase in flow of money round the year (WMS=2.35, rank II), and an increase in control over resources (WMS=2.31, rank III). In the Eastern zone, the majority of respondents reported an increase in income and employment, which received the highest weighted mean score

of 2.6, as well as an increase in control over resources (WMS=2.45, rank II), and an increase in flow of money round the year (WMS=2.41, rank III), among respondents indicating impact of IFS on economic improvement. The similar findings were reported by many studied Khan *et al.*, (2015) [3]; Sasikala *et al.*, (2015) [10]; Ponnusamy and Devi, (2017) [9]; Kumar *et al.*, 2018 [4]; Panwar *et al.*, (2018) [8] and Mukhils *et al.*, 2018 [7].

**Table 5:** Impact of IFS on economic improvement of the respondent N=120

Aspects	Western Zone F (%) N=60			W.M.S.	Rank	Eastern Zone F (%) N=60			W.M.S.	Rank
	I	D	R.S.			I	D	R.S.		
<b>Economic improvement</b>										
Income and employment	43 (71.7)	4 (6.6)	13 (21.7)	2.5	I	47 (78.4)	2 (3.3)	11 (18.3)	2.6	I
Cost of production	29 (48.3)	5 (8.3)	26 (43.4)	2.05	V	32 (53.3)	6 (10.0)	22 (36.7)	2.16	IV
Flow of money round the year	39 (65.0)	3 (5.0)	18 (30.0)	2.35	II	37 (61.7)	11 (18.3)	12 (20.0)	2.41	III
Control over resources	35 (58.3)	9 (15.0)	16 (26.7)	2.31	III	41 (68.3)	5 (8.3)	14 (23.4)	2.45	II
Investment in productive assets	33 (55.0)	7 (11.7)	20 (33.3)	2.21	IV	32 (53.3)	1 (1.7)	27 (45.0)	2.08	V

Figures in parenthesis indicate percentages (I-Increase, D-Decrease, R.S-Remain same, W.M.S. -Weighted Mean Score)



**Fig 5:** Impact of IFS on economic improvement of the respondent

**Impact of IFS on environmental improvement**

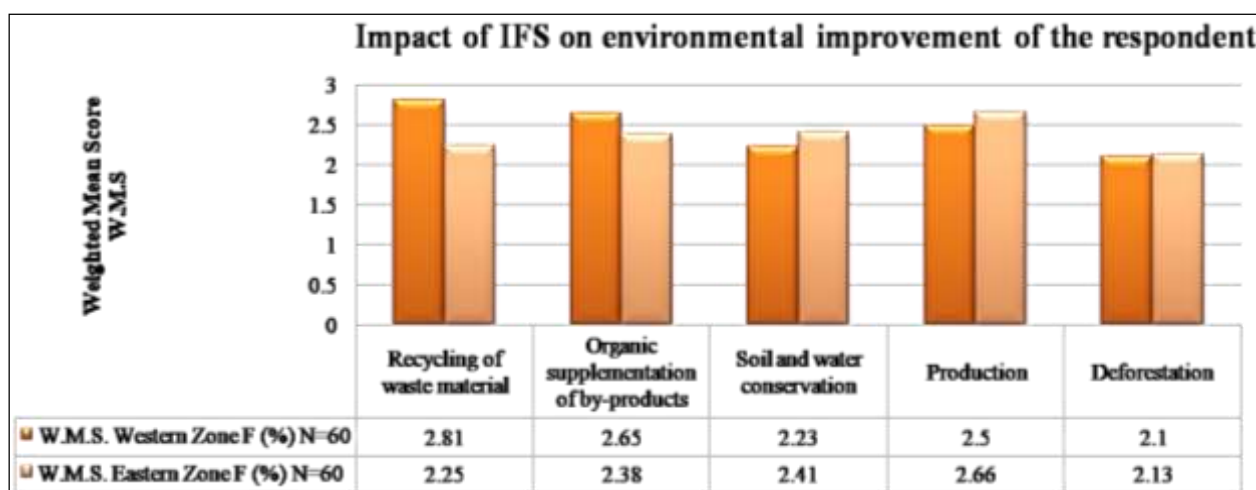
Table 6 depicts that majority of respondents in the Western zone reported an increase in recycling of waste material (WMS=2.81, rank I), organic supplementation of by-products (WMS=2.65, rank II) and production (WMS=2.5, rank III) among those reporting an influence of IFS on environmental improvement. The majority of respondents in the Eastern zone reported an increase in recycling of waste material,

which received the highest weighted mean score of 2.66, as well as an increase in soil and water conservation (WMS=2.41, rank II) and an increase in organic supplementation of by-products (WMS=2.38, rank III), all of which indicate that IFS has had an impact on environmental improvement. The above results are in par with the studies conducted by Khan *et al.*, (2015) [3] and Ali & Ahmad (2018) [1].

**Table 6:** Impact of IFS on environmental improvement of the respondent N=120

Aspects	Western Zone F (%) N=60			W.M.S.	Rank	Eastern Zone F (%) N=60			W.M.S.	Rank
	I	D	R.S.			I	D	R.S.		
Recycling of waste material	53 (88.3)	3 (5.0)	4 (6.7)	2.81	I	33 (55.0)	9 (15.0)	18 (30.0)	2.25	IV
Organic supplementation of by-products	47 (78.3)	5 (8.3)	8 (13.4)	2.65	II	38 (63.3)	7 (11.7)	15 (25.0)	2.38	III
Soil and water conservation	36 (60.0)	9 (15.0)	15 (25.0)	2.23	IV	41 (68.3)	3 (5.0)	16 (26.7)	2.41	II
Production	43 (71.7)	4 (6.6)	13 (21.7)	2.5	III	47 (78.3)	6 (10.0)	7 (11.7)	2.66	I
Deforestation	20 (33.3)	26 (43.4)	14 (23.3)	2.1	V	22 (36.7)	24 (40.0)	14 (23.3)	2.13	V

Figures in parenthesis indicate percentages (I-Increase, D-Decrease, R.S-Remain same, W.M.S. -Weighted Mean Score)



**Fig 6:** Impact of IFS on environmental improvement of the respondent

**Livelihood security in adoption of integrated farming system**

Table 7 shows that the majority of respondents in the Western zone were highly satisfied with food and nutritional security, which received the highest weighted mean score of 2.53, followed by health security (WMS=2.5, rank II), and agricultural security (WMS=2.48, rank III) among respondents indicating livelihood security in the adoption of the Integrated Farming System. Among respondents

indicating livelihood security in the adoption of the Integrated Farming System, the majority of respondents in the Eastern zone reported as highly satisfied with agricultural security (WMS=2.5, rank II), food and nutritional security (WMS=2.5, rank II), and satisfied with economic security (WMS=2.41, rank III). The similar results are in line with Sasikala *et al.*, 2015 [10]; Ponnusamy and Devi, (2017) [9]; Kumar and Desai, (2017) [5]; Ali & Ahmad, (2018) [11]; Dahiya *et al.*, 2019 [2] and Wulandari *et al.*, 2020 [11].

**Table 7:** Livelihood security in adoption of Integrated Farming System N=120

Parameters	Western Zone F (%) N=60			W.M.S	Rank	Eastern Zone F (%) N=60			W.M.S	Rank
	Highly satisfied	Satisfied	Not satisfied			Highly satisfied	Satisfied	Not satisfied		
Food and Nutritional security	37 (61.7)	18 (30.0)	5 (8.3)	2.53	I	33 (55.0)	24 (40.0)	3 (5.0)	2.5	II
Health security	39 (65.0)	12 (20.0)	9 (15.0)	2.5	II	16 (26.7)	37 (61.7)	7 (11.6)	2.15	VII
Social security	16 (26.7)	29 (48.3)	15 (25.0)	2.01	VII	26 (43.3)	22 (36.7)	12 (20.0)	2.23	V
Agricultural security	34 (56.7)	21 (35.0)	5 (8.3)	2.48	III	38 (63.3)	17 (28.3)	5 (8.4)	2.55	I
Infrastructural security	18 (30.0)	34 (56.7)	8 (13.3)	2.16	VI	33 (55.0)	14 (23.3)	13 (21.7)	2.33	IV
Economic security	19 (31.7)	38 (63.3)	3 (5.0)	2.26	V	26 (43.3)	33 (55.0)	1 (1.7)	2.41	III
Environmental security	25 (41.7)	28 (46.7)	7 (11.6)	2.3	IV	21 (35.0)	28 (46.7)	11 (18.3)	2.16	VI

Figures in parenthesis indicate percentages (W.M.S. -Weighted Mean Score)

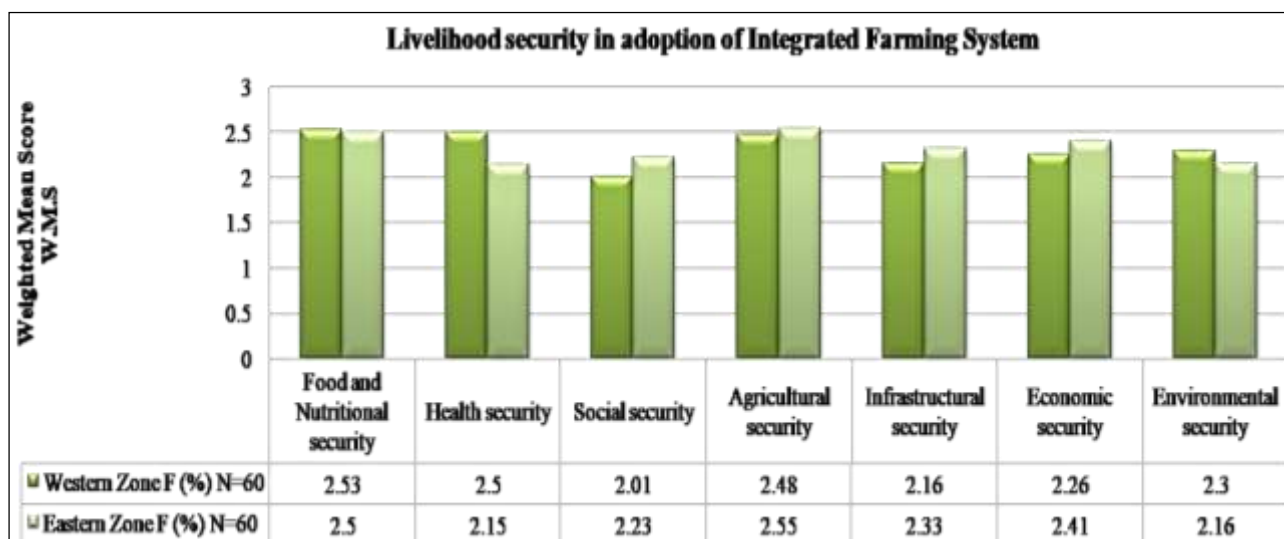


Fig 7: Livelihood security in adoption of Integrated Farming System

### Conclusion

It was found that majority of respondents in both the Western and Eastern zones reported that income generated through the Integrating Farming System (IFS) had a positive impact on meeting their needs requirement and fully satisfied with their basic needs, social and economic needs. The majority of respondents reported that the Integrated Farming System had a favourable influence on household income, with an increase in household consumption, savings, and family income after practicing the Integrated Farming System. The majority of respondents indicated that IFS had a favourable impact on their nutritional status, indicating an increase in the availability of fresh fruits and vegetables, good quality of food, and expenditure on health care. The majority of respondents indicated IFS increased their livelihood security by increasing their food and nutritional security, health security, agricultural security, food and nutritional security, and economic security.

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